

^{Dzh.}
AKHUNDOV, Dzh.S., Cand Agr Sci -- (diss) "Effect of
corn ^{fodder} ~~feed~~ and ^{conditions} ~~at~~ maintenance ^{on} the meat-
fattening of ^{roosters} ~~cocks~~." Mos 1958, 22 pp. (Mos Vet Acad of
Min of Agr USSR. Chair of ^{Zoohygiene} ~~Zoological Hygiene~~) 110 copies
(KL, 21-58, 91)

- 49 -

Q-3

USSR/Farm Animals. - Poultry.

Abs Jour : Ref Zhur - Biol., No 1, 1959, 2/41

Author : Adhundev, D.S.

Inst : Effect of Maize on the Fattening of Cockerels.

Orig Pub : Ptitsvodstvo, 1958, No 1, 33-34.

Abstract : In the Tomilinskaya Poultry Plant, cockerels were divided into two experimental groups. The control cockerels were fed with fixed rations, and the experimental ones were fed with a ration in which the grain part was replaced by 50 grams of maize kernels. The nutritiveness of both rations was the same. After 16 days of fattening the increment in weight in the control group was 371 grams, and in the experimental group 565 grams; the outlay of feed-stuffs per kg of increment in weight amounted to 4.31 kg for the first group as compared with 2.83 kg for the second. In another experiment, the mean daily weight

Card 1/2

AKHUNDOV, E.B.

Apparatus for controlling the self-starting conditions of asynchronous
motors. Trudy Inst. energ. AN BSSR no.6:228-231 '58.
(MIRA 13:2)

(Electric motors, Induction)

25 (1)
AUTHOR:

Akhundov, E. B., Candidate of Technical Sciences SOV/105-59-6-19/28

TITLE:

On Problems of Methods of Technical and Cost Calculation in Power Industry (K voprosu o metodike tekhniko-ekonomicheskikh raschetov v energetike)

PERIODICAL: Elektrichestvo, 1959, Nr 6, pp 81 - 85 (USSR)

ABSTRACT:

In this paper, which is offered to discussion, an attempt is made to generalize existing methods of technical and cost calculations and to draw several conclusions, which may still be debated. The author is of the opinion that in this way it will be easier to arrive at favorable variants. The concept of redemption time which is widely used in technical and cost calculations does not directly characterize the redemption of additional capital investments if different variants are compared, and it may serve only as a convenient quantity in calculations. The method presented in this paper permits the selection of a certain redemption time according to the data resulting from the first year of operation of the assumed variants in dependence of the lifetime, the coefficient of the annual revenue of capital investments and the reduction of running costs. The ad-

Card 1/2

On Problems of Methods of Technical and Cost
Calculation in Power Industry

SOV/105-59-6-19/28

missible limit values of the calculated redemption period are mainly determined by the assumed coefficient of annual revenue of the capital investments. The author is of the opinion that it is necessary to give this coefficient a scientific foundation and to standardize it. The range of values for this coefficient is found to vary widely with different authors. It may be assumed that it is between 1.1 and 1.2. If the objects have only a short lifetime and if material reserves available are abundant, it may be ignored. There are 3 figures, 3 tables, and 3 Soviet references.

ASSOCIATION: Institut energetiki AN BSSR (Institute of Power Engineering of the Academy of Sciences of the Belorussian SSR)

SUBMITTED: October 22, 1958

Card 2/2

AKHUNDOV, K.B.

Consideration of construction time in technological cost accounting
of electric power production. Trudy Inst. energ. AN BSSR no.9:135-
140 '59. (MIRA 13:10)

(Electric power production)

AKHUNDOV, E.B.; AVRAMENKO, A.V.; BAMPI, Yu.S.

Optimum power of a condensing electric power plant
operated on peat. Trudy Inst.energ. AN BSSR no.10:12-21
'59. (MIRA 13:6)
(Peat) (Electric power plants)

AKHUNDOV, E.B.; KAKHANOVICH, V.S.

Problem of the direct measurement of relative increments
in power installations. Trudy Inst.energ. AN BSSR no.10:
81-97 '59. (MIRA 13:6)
(Electric power production)

AKHUNDOV, E.B., kand.tekhn.nauk; KAKHANOVICH, V.S., inzh.

Measuring the relative increase of power installations. Elek.
sta. 31 no.2:38-41 F '60. (MIRA 13:5)
(Power engineering)

AKHUNDOV, E.B., kand.tekhn.nauk (g.Minsk)

Problems concerning the methodology for engineering and efficiency
calculations in power engineering. Elektrichestvo no.11:82-83 N
'61. (MIRA 14:11)

(Power engineering--Accounting)

AKHUNDOV, E.B., red.; PEKELIS, G.B., red.; DOROSHEVICH, M.M., red.;
KLIONSKAYA, R.I., red.; MARIKS, L., red. izd-va; ATLAS, A.,
tekhn. red.

[Automation, control, and increase in the efficiency of
electric power systems] Avtomatizatsiia, kontrol' i povyshenie
ekonomichnosti energoustanovok. Minsk, Izd-vo Akad.nauk
BSSR, 1962. 202 p. (MIRA 15:9)

1. Akademiya navuk BSSR, Minsk. Instytut energetyki.
(Automatic control) (Electric power plants)

TOP SECRET (S) Po-L/Pq-L/Pg-L/Pk-L TJP(c)/AEDC(a)/SSD/ESD/AFNL/
GG/BB

ABSTRACT

German, M. M.

TITLE Semiconductor analog-to-digital voltage converter

SOURCE Prihorostroyeniye, no. 5, 1984, 12-13

TOPIC TAGS Automatic control; industrial; automatic control; analog digital converter; digital comp; for semiconductor; voltage; converter

ABSTRACT: A new voltage-to-digital converter is intended for introducing process sensor information into a digital control system. The converter is designed to operate in a wide range of input voltages and is compatible with standard digital logic.

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ACCESSION NR: AP4038886

this operation. A transistorized comparison device yields the time intervals proportional to the running value of the input voltage. A special transistorized gate is controlled by the comparator pulses and turns a pulse generator on and off. The latter produces 5-v. 0.25 microsecond pulses at a repetition frequency of 1 kHz. The number of pulses equivalent to a voltage value is counted in a transistorized binary counter. Max input voltage: 2.5 V. Conversion frequency: 300 cps. ambient temperature: up to 40°C. claimed apparatus error: 0.2%. Orig. art. has. 4 figures

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: DP, EC

NO REF SOV: 003

OTHER: 000

Card 2/2

AKHUNDOV, F., inzh. (Baku)

Search for technological contradictions. Izobr.i rats. no.2:33-34
F '59. (MIRA 12:3)

(Inventions)

AKHUNDOV, F.A.

AZIZBEKOV, Sh.A.; AKHUNDOV, F.A.

Petrographic characteristics of Triassic deposits of the Sharur-Dzhul'fa anticlinorium. Dokl. AN Azerb. SSR 13 no.10:1063-1067 '57.
(MIRA 10:12)

1. Institut geologii.

(Nakhichevan A.S.S.R.--Geology, Stratigraphic)

AKHUNDOV, F.A.; MAMEDOV, T.M.

~~AKHUNDOV, F.A.; MAMEDOV, T.M.~~
New data on the TSakuri deposit of Iceland spar in the Karabakh
Upland. Izv. AN Azerb. SSR. Ser.geol.-geog. nauk no.5:51-56 '59
(Karabakh Upland--Iceland spar) (MIRA 13:3)

AKHUNDOV, F.A.; MAMEDOV, T.M.

Qualitative description of Iceland spar crystals in the northeastern
part of the Nagorno-Karabakh Autonomous Province. Izv.AN Azerb.SSR.
Ser.geol.-geog.nauk no.5:101-109 '60. (MIRA 14:5)
(Nagorno-Karabakh Autonomous Province—Iceland spar crystals)

AKHUNDOV, F.A.

Santonian globular lavas of the Martuni synclinorium which include
Iceland spar. Dokl. AN Azerb. SSR 17 no. 4: 289-292 '61. (MIRA 14:6)

1. Institut geologii AN AzerSSR. Predstavleno akademikom AN AzerSSR
M.A. Kashkayem.

(Aucasus--Lava) (Iceland spar)

AZIZBEKOV, Sh. A., AKHUNDOV, F.A.

Secondary processes in Triassic carbonate deposits of
the Shurra-Dzhul'fa anticlinorium. Dokl. AN Azerb. SSR
16 no.1:45-47 '60. (MIRA 13:6)

1. Institut geologii AN Azerbaydzhanskoy SSR.
(Azerbaijan--Rocks, Carbonate)

AKHUNDOV, F.A.; MAMEDOV. T.M.

Petrography of Santonian volcanic rocks enclosing Iceland spar
in the Martuni synclinalorium. Uch.sap. AGU. Geol.-geog.ser.
no.6:119-128 '59. (MIRA 15:9)

(Karabakh Upland—Petrology)

(Karabakh Upland—Iceland spar)

AKHUNDOV, F.A.; MAMEDOV, T.M.

Genesis of Iceland spar associated with the basic Santonian
effusions in the Martuni synclinalorium. Uch. zap. AGU. Ser.
geol. geog. nauk no.1:19-23 '61. (MIRA 16:8)

AKHUNDOV, F.G.

Effect of different amounts and the time of application of mineral fertilizers on the cotton yield in some soils in the Aras foothill plain. Izv.AN Azerb.SSR.Ser.biol.i med.nauk no.3:93-97 '62.

(MIRA 15:9)

(ARAS VALLEY--COTTON--FERTILIZERS AND MANURES)

GUSEYNOV, R.K.; AKHUNDOV, F.G.

Effect of liquid and concentrated nitrogen fertilizers on the growth, development and nitrogen accumulation in the cotton plant. Dokl. AN Azerb. SSR 19 no.7:61-63 '63.

(MIRA 17:12)

1. Institut pochvovedeniya i agrokhimii AN AzerSSR.

AKHUNDOV, F.M.

Some data on a peculiar representative of *Necromites nestoris* Bog.
of the order of pinnipedians. Izv. AN Azerb. SSR. Ser. geol.-geog.
nauk no.1:73-86 '60. (MIRA 13:11)
(Pinnipedia, Fossil)

BURCHAK-ABRAMOVICH, N.I.; AKHUNDOV, F.M.

Fossil camels *Paracamelus gigas* Schlosser in Azerbaijan. Izv.
AN Azerb. SSR. Ser. geol-geog. nauk no.6:45-50 '60. (MIRA 14:3)
(Azerbaijan-Camels, Fossils)

AKHUNDOV, F.M.

Morphological differences between the *Necromites Nestoris* and the family *Semantoridae* (Mammalia, Pinnipedia). Izv. AN Azerb.SSR. Ser. geol.-geog.nauk i nafti no.3:9-14 '63. (MIRA 16:11)

ALIYEV, A.R., dotsent; BURTIKOVA, T.A., kand. med. nauk; AKHUNDOV, F.M.

Some hemodynamic changes during M.A. Topshibashev's combined
analgesic anesthesia. Azerbaidzh. med. zh. 6:34-40 Je '63

(MIRA 17:1)

1. Iz fakul'tetskoy khirurgicheskoy kliniki lecheno-profilakti-
cheskogo fakul'teta Azerbaydzhanskogo gosudarstvennogo meditsin-
skogo instituta imeni N.Narimanova.

AKHUNDOV, F.M.

Effect of various doses and compositions of neuroplegic
drugs on the hemodynamic indices in analgesia. Azerb. med.
zhur. 41 no.3:47-54 Mr '64. (MIRA 17:10)

AKHUNDOV, F.M.

Changes in the functional state of the heart according to data of clinical electrocardiography during operations performed under analgesic anesthesia. Azerb. med. zhur. 41 no. 11:3-9 N '64. (MIRA 18:12)

1. Submitted Dec. 24, 1963.

AKHUNDOV, F. M.

AID P - 1888

Subject : USSR/Electricity
Card 1/2 Pub. 28 - 5/5
Authors : Samorodov, I. I. and Akhundov, F. M.
Title : Portable instrument for quick determination of the power factor
Periodical : Energ. byul., no.3, 31-32, Mr 1955
Abstract : Two papers making proposals on this subject were presented in the competition for the best suggestion on the more economical consumption of electric power. One of them, submitted under the title "Portable Phasemeter-Tongs" was by Samarodov, I. I., the other "Instrument Controlling Performance of Electric Machines", by Akhundov, F. M. The two authors proposed comparable analogical apparatuses, and so were awarded a divided second prize. The underlying principle of operation of these instruments is the ferrodynamic phase-lag meter with a disconnecting

AZIMOV, B.A., kand.tekhn.nauk; AKHUNDOV, F.M., kand.tekhn.nauk;
GUSEYNOV, F.G., kand.tekhn.nauk

Electrodynanic continuous stator brake for draw works. Trudy
AzNII DN no.5:342-383 '57. (MIRA 12:4)
(Brakes) (Hoisting machinery)

AZIMOV, B.A., kand. tekhn. nauk; AKHUNDOV, F.M., red.; SHTEYNGEL',
A.S., red. izd-va; NASIROV, N., tekhn. red.

[Electric drives for oil well drilling equipment] Voprosy
neftburovogo elektroprivoda. Baku, Azerbaidzhanskoe gos.
izd-vo, 1962. 395 p. (MIRA 15:8)
(Oil well drilling rigs--Electric driving)

AKHUNDOV, G.A.

112-6-11843

Translation from: Referativnyy zhurnal, Elektrotehnika, 1957, Nr6, p.9 (USSR)

AUTHOR: Abdullayev, G., Akhundov, G.

TITLE: Investigation of Conductivity and Thermo-e.m.f. of Some Semiconductors
(Issledovaniye elektroprovodnosti i termo-e.d.s. nekotorykh poluprovodnikov)

PERIODICAL: Izvestiya AN Az. SSR, 1955, Nr12, pp.3-16

ABSTRACT: Determined were the el. conductivity and thermo-emf of the electron synthetic semiconductors SnSe and Bi₂S₃, which were of interest because thin layers of these compounds are formed in selenium rectifiers, and PbS and MoS₂ (possibility of using these natural minerals for transistors were explored). The measured values of electric conductivity in $10^{-3} \text{ ohm}^{-1} \text{ cm}^{-1}$ units are:
SnSe - from 5.128 at 20° to 166 at 300°
Bi₂S₃ - from 0.2 to 77
PbS - from 107.6 to 1755 at 290°
MoS₂ - from 0.1151 to 6.289
Activation energy values are computed. Curves of thermo-emf plotted against temperature for the above semiconductors are given. Bibliography: 4 titles.

M.A.B.

Card 1/1

AKHUNDOV, G.A.

ABDULLAYEV, G.B.; ~~AKHUNDOV, G.A.~~; ALIYEV, M.G.

Mechanism of intensive field effects in p-n junctions. Dokl. AN
Azerb. SSR 12 no.11:787-791 '56. (MLRA 10:3)

1. Institut fiziki i matematiki AN Azerbaydzhanskoy SSR.
(Semiconductors)

Akhundov G.A.
AKHUNDOV, G.A.; ABDULLAYEV, G.B.

Studying the diffusion of thallium, tin, and indium in selenium.
Dokl. AN Azerb. SSR 13 no.11:1145-1148 '57. (MIRA 10:12)

1. Institut fiziki i matematiki AN AzerSSR.
(Selenium) (Diffusion) (Metals)

AKHUNDOV, G.A., Cand Phys Math Sci -- (diss) "Study of diffusion processes in selenium rectifiers by the radioisotope method."
Baku, Pub House of Acad Sci AzSSR, 1958, 9 pp (Min of Higher Education USSR. Azerbaydzhan State Univ im S.M. Kirov) 100 copies (EL, 27-58, 101)

- 3 -

69395

SOV/137-59-4-8422

Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 4, p 155 (USSR)

24.7700

AUTHOR:

Akhundov, G.A.

TITLE:

Investigation of Diffusion in Some Semiconductors and Semiconductor Rectifiers

PERIODICAL:

Uch. zap. Azerb. un-t, 1958, Nr 2, pp 21 - 26 (Azerb. résumé)

ABSTRACT:

The author investigated diffusion of Tl and Se in $Cd-Sn$ -alloy, diffusion of Se in $InSe$ and self-diffusion of Sn . For the coefficient of diffusion D of Tl^{240} and Se^{75} in $Cd-Sn$ -alloy (temperature of the experiments was $100^\circ, 140^\circ, 170^\circ C$) the following expressions were found: $D_{Tl \rightarrow CdSn} = 6.8 \cdot 10^{-4} \exp(-0.6/kT)$, $D_{Se \rightarrow CdSn} = 3.47 \cdot 10^{-10} \exp(-0.16/kT)$. In diffusion of Cd, Sn, Tl in $Cd-Sn$ -alloy and also of Tl, Sn, In in semi-crystalline Se , a linear dependence of the activation energy ΔE on the atomic radius of the diffusing elements was revealed. In the case of Sn self-diffusion at $100 - 218^\circ C$ $D_{Sn \rightarrow Sn} = 1.35 \cdot 10^{-7} \exp(-0.27/kT)$. The authors studied diffusion of components in Tl_2Se and $InSe$ compounds which were applied in a vacuum to a metallic backing. For Se diffusion in

Card 1/2

SOV/137-58-9-19704

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 9, p 225 (USSR)

AUTHORS: Akhundov, G.A., Abdullayev, G.B.

TITLE: On the Diffusion of Cadmium and Tin in the Cd-Sn Alloy (O diffuzii kadmiya i olova v splave Cd-Sn)

PERIODICAL: Dokl. AN Azerbaydzhan SSR, 1958, Vol 14, Nr 2, pp 103-104

ABSTRACT: The determination of the parameters of diffusion of Cd and Sn in the industrial alloy of 32% Cd - 68% Sn (used in Se rectifiers) was carried out with the aid of Cd^{115} and Sn^{113} isotopes by the layer-removal method. Diffusion annealing was conducted under vacuum for 20-50 hours at 50-160°C. The following coefficients of diffusion were found: $cd_{Cd} = 4.43 \cdot 10^{-8} \exp(-4500/RT)$ and $cd_{Sn} = 5.92 \cdot 10^{-7} \exp(6700/RT) \text{ cm}^2 \text{ sec}^{-1}$.

R.O.

1. Cadmium-tin alloys--Analysis
2. Cadmium--Determination
3. Tin--Determination
4. Cadmium isotopes (Radioactive)--Performance
5. Tin isotopes (Radioactive)--Performance

Card 1/1

AUTHORS: Akhundov, G. A., Abdullayev, G. B. 20-119-2-20/60

TITLE: Investigation of the Diffusion of Components in Tl_2Se by Means of Marked Atoms (Izucheniye diffuzii komponentov v Tl_2Se metodem mechenykh atomov)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol 119, Nr 2, pp 267 - 267 (USSR)

ABSTRACT: The physical properties of semiconducting compounds strongly depend on small and very small deviations from the stoichiometric ratio, especially on the surface of the semiconductor. In semiconductor apparatus, especially in selenium rectifiers, the semiconductor is constantly in connection with a metal and therefore a chemical compound forms. The density and the physical properties of this compound determine the characteristics of the apparatus. In the thallium rectifiers the thallium is in contact with selenium and obviously a thin layer of Tl_2Se is formed. In connection with the investigation of the physical processes in thallium-selenium rectifiers it was of interest to investigate the diffusion of the single components in a

Card 1/4

20-119-2-20/60

Investigation of the Diffusion of Components in Tl_2Se by Means of Marked Atoms

Tl_2Se -semiconductor as function of the temperature. The samples were produced by fusing thallium with selenium, the corresponding weight ratios corresponded with an accuracy of $2 \cdot 10^{-4} \text{ g}$ to the stoichiometric composition. The synthesis took place in a vacuum of 10^{-3} mm torr. at a temperature of 450°C and lasted for 6 hours. From the thus produced Tl_2Se -sample some 12 mm long cylinders of a diameter of about 6mm were produced and they were ground on both sides with emery-paper. On the one front of these cylinders the radioactive isotopes Tl^{204} and Se^{75} were applied electrolytically. The diffusion annealing was carried out in evacuated and sealed ampoules at temperatures of from $150 - 300^\circ \text{C}$ it lasted for 15 - 20 hours. After annealing the number of impulses from the diffused through substances was radiometrically determined

Card 2/4

20-119-2-20/60

Investigation of the Diffusion of Components in Tl_2Se by Means of Marked Atoms

according to the method of the separation of thin layers. The formula for the calculation of the diffusion coefficient is put down and shortly explained. From the temperature dependences of the diffusion coefficient D for the diffusion of thallium and selenium in Tl_2Se the following equations were found:

$$D_{Tl \rightarrow Tl_2Se} = 1.17 \cdot 10^{-3} e^{-0.61/kT} \text{ cm}^2 \text{ sec}^{-1};$$

$$D_{Se \rightarrow Tl_2Se} = 2.25 \cdot 10^{-5} e^{-0.58/kT} \text{ cm}^2 \text{ sec}^{-1},$$

i.e. for the diffusion of Tl and Se the activation energy ΔE and the constant D_0 are equal respectively to 0.61 eV; $1.16 \cdot 10^{-8} \text{ cm}^2 \text{ sec}^{-1}$ and 0.58 eV; $2.25 \cdot 10^{-5} \text{ cm}^2 \text{ sec}^{-1}$. There are 1 figure and 1 reference,

Card 3/4

20-119-2-20/60

Investigation of the Diffusion of Components in Tl_2Se by Means of Marked Atoms

1 of which is Soviet.

ASSOCIATION: Institut fiziki i matematiki Akademii nauk AzerbSSR
(Institute for Physics and Mathematics AS Azerbaydzhan SSR)

PRESENTED: October 24, 1957, by A.F. Ioffe, Member, Academy of Science, USSR

SUBMITTED: September 6, 1957

Card 4/4

ABDULLAYEV, G.B.; AKHUNDOV, G.A.; ALIYEVA, M.Kh.

Rectifying property of PbS. Dokl. AN Azerb. SSR 15 no. 11: 999-1003
'59. (MIRA 13:4)

1. Institut fiziki AN AzerSSR.
(Lead sulfide--Electric properties)

AKHUNDON, G. A.

PLATE I BOOK EXTRACTS

SVU/466

Sovetskoye po poluprovodnikovym materialam. Moscow, 1957

Toporny metallurgii i fiziki poluprovodnikov (tutty 3-ye sovetskoye. (Problems in the Metallurgy and Physics of Semiconductors) Transactions of the Third Conference) Moscow, Gostekhizdat SSSR, 1959. 129 p. Kirela slip inserted. 3,400 copies printed.

Sponsoring Agency: Akademiya nauk SSSR, Institut metallurgii i fiziki poluprovodnikov. Resp. K. I. B. Kh. Akhondov, Doctor of Chemical Sciences; K. I. B. Kh. Akhondov, Doctor of Chemical Sciences.

PREPARED: This collection is intended for technical and scientific personnel concerned with the investigation and production of semiconducting materials. It may also be used by students in schools of metallurgy.

CONTRIBUTORS: The collection contains reports submitted at the Third Conference on Semiconducting Materials, held at the Institute of Metallurgy, Academy of Sciences, USSR, Moscow, in May 1957. The reports deal with problems of metallurgy and investigating germanium, silicon, and semiconductor compounds. The collection was first edited by D. A. Petrov, Doctor of Technical Sciences. References accompany most of the reports.

GALILEO, V. V. On the Problem of the Role of Some Factors in the Growth Process of Single Crystals from a Melt. 23

TALYPO, I. B. Investigation of Hole Zones of Diamond-Type Crystals. 29

SILYPI, Academician (Academy of Sciences, Hungarian People's Republic). Concerning the Problem of Semiconductor Point-Contacts. 40

MEYER, I. (Institute of Basic Technical Problems, Polish Academy of Sciences). Properties of P-N Junctions in Germanium Single Crystals Withdrawn from the Melt by Pulling. 43

SONOVSKI, I. (Institute of Physics, Polish Academy of Sciences). Error of the Introduction of Minority Current Carriers on Light Ionization from Germanium. 49

BURY, A. A., V. Ye. Iosadko, and Ye. G. Maslyuk. Diffusion and Solubility of Iron and Silver in Germanium. 52

VYALIN, A. P., and V. A. Prikhod. Investigation of Holstead of Semiconductors with Seals. 57

VASILYEVSKI, I. S., and Ye. G. Maslyuk. Investigation of Segregation and Solubility of Some Impurities in Germanium During Crystallization. 62

TROULL (Institute of Technical Physics, Czechoslovak Academy of Sciences). Problem of Obtaining Pure Silicon. 64

PELOV, D. A., Yu. M. Shakhov, V. V. Bobashevskiy, V. Ye. Shakhovskiy, and V. D. Eroshnikov. Raising of Silicon Single Crystals. 69

Raising Technology (Institute of Applied Physics, Chinese People's Republic). Importance of Using Pure Water for Washing Materials Used in Semiconductor Engineering. 78

ABDULAYEV, G. B., M. I. Alyev, A. A. Bakhmalov, and G. M. Alyev. Effect of Halide Impurities on the Physical Properties of Selenium. 80

On the Diffusion of Germanium in Polycrystalline Selenium. 89

Dobala, L. D., and M. Kh. Ahrimov. Problems of Alloying Selenium. 94

ABDULAYEV, I. B., M. I. Alyevskiy, and V. D. Puzosha. Effect of Growth Conditions of Single Crystals of CdS and CdTe on Their Physical Properties. 107

Professors, A. P., and G. A. Fedorus. Effect of Temperature and Certain Impurities on the Dark Resistance and Photoconductivity of CdS Single Crystals. 112

SILYPI, I. (Institute of Technical Physics, Czechoslovak Academy of Sciences). Semiconducting Compounds With an Excess of One of the Components. 117

SHAROV, V. P. Effect of Surface Condition on the Electrical Properties of Type A-110 Compounds. 120

PANOV, V. A., N. A. Krivov, V. B. Vozgornitsky, A. G. Gaidukov, and Ye. V. Kovalyova. Production and Investigation of New Semiconducting Materials. 127

AVAILABLE: Library of Congress. 27/466/oa
5/20/61

AKHundov, G. A.

82543

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B006/B070

24.7700

AUTHORS: Akhundov, G. A., Abdullayev, G. B., Guseynov, G. D.TITLE: Some Properties of Single Crystals of Thallium Selenide ¹

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 7, pp. 1518-1521

TEXT: In the introduction, the authors discuss results already available in publications on the investigation of thallium selenide ¹semiconductors. In the present work, the method of preparation of single crystals of TlSe is discussed, and the results of investigation of the electrical properties of such crystals are given. For the preparation of single crystals, 99.989% pure thallium and 99.994% pure selenium were used (total weight: 90 gm). TlSe was obtained in evacuated (10^{-4} torr) quartz ampoules at 500°C in six hours. An X-ray analysis showed that the TlSe had crystallized in tetragonal form with the parameters $a = 8.02$ and $c = 7.00$ Å. The single crystals were obtained by zonal fusing. Fig. 2 shows the photograph of such a crystal in the form of a bar 15 cm long and 1.5 cm in diameter. Fig. 1 shows a Laue diagram obtained after seven

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Some Properties of Single Crystals of
Thallium Selenide

S/181/60/002/007/020/042
B006/B070

zonal fusions with a horizontal zone shift of 10 mm/hour. Identical crystals were obtained by a zone shift of 6 mm/hour. For horizontal as well as for vertical zone shift the (001) plane was the plane of growth. The electrical conductivity and the Hall effect were investigated for a TlSe parallelepipedon of $3 \times 4 \times 15 \text{ mm}^3$. Fig. 3 shows the measured temperature dependence of the electrical conductivity σ for four samples, whose resistivities at 20°C were 1, 3.2, 3.5, and 49 ohm.cm. It is found that the σ of low-resistivity samples first falls with lowering of temperature, then goes through a maximum, and again increases. The larger the resistivity, the lower is the temperature of transition from metallic to the semiconductor state. The minima of the low-resistivity samples lie at 195, 165, and 120°C (curves 1, 2, 3). The pure sample 4 has no minimum. The activation energy of this sample was determined to be 0.56 eV. Fig. 4 shows the temperature dependence of the electrical conductivity, the carrier concentration, and the carrier mobility of sample 3. It appears that the decrease of σ with increase in temperature up to the temperature of transition may be explained as being due to a decrease of the carrier mobility. In this range, the carrier concentration remains nearly

Card 2/3

ABHUNDLOV, G.A.; ALIYEV, I.M.; SHAYEV, A.M.

Photoconductivity of 1155. Dokl. Akad. SSR 16 No. 11:1052-
1057 '60. (NIA 14:2)

1. Institut fiziki AN AzerSSR. Predstavleno akademikom AN
AzerSSR Z.I. Khalilovym.
(Thallium selenide--electric properties)

S/137/62/000/002/058/14
A006/A101

AUTHOR: Akhundov, G. A.

TITLE: On diffusion of components in Tl_2Se and InSe and rectifying on the Se- Tl_2Se and Se-InSe boundary

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 2, 1962, 39 - 40, abstract 2G303 (V sb. "Vopr. metallurgii i fiz. poluprovodnikov", Moscow, AN SSSR, 1961, 100 - 103)

TEXT: The author studied physical properties and diffusion of components in semiconductor Tl_2Se and Se-InSe compounds, and also rectifying on the Se- Tl_2Se and Se-InSe boundary. Tl_2Se and InSe specimens were prepared by synthesis. The Se-rectifiers studied represented a system of bismuthized Al-backing, Se, Tl_2Se or InSe layers applied to the Se surface by sublimation in a vacuum, and a Cd-Sn or Bi-alloy upper electrode. It is shown that for Tl_2Se the resistance as a function of temperature has a metallic nature, and for InSe a semi-conductor exponential form with activation energy of 0.1 and 0.03 ev respectively for intrinsic and impurity current carriers. In all the experiments p-type Tl_2Se changed to n-type after sublimation, and the Se and Tl_2Se boundary had a pronounced

Card 1/2

30956

24.7700(110, 114, 1385)

S/576/61/000/000/013/020
E036/E162

AUTHORS: Akhundov, G.A., Abdullayev, G.B., Aliyeva, M.Kh., and Efetdinov, G.A.

TITLE: Preparation and investigation of the semiconducting materials AgTe, Ag₂Se, SnTe and CdTe

SOURCE: Soveshchaniye po poluprovodnikovym materialam, 4th. Voprosy metallurgii i fiziki poluprovodnikov; poluprovodnikovyye soyedineniya i tverdye splavy. Trudy soveshchaniya. Moscow, Izd.-vo AN SSSR, 1961. Akademiya nauk SSSR. Institut metallurgii imeni A.A. Baykova. Fiziko-tekhnicheskiy institut. 104-106

TEXT: To explain the properties of thin films of binary compounds deposited on various substrates it is necessary to investigate the bulk properties. In this paper the investigation of thermal and electrical conductivities and the structure of the following compounds are reported: Ag₂Te, Ag₂Se, SnTe and CdTe. These compounds were obtained by fusing together the components, which had been weighed to an accuracy of 2×10^{-4} g. The synthesis was carried out by heating slowly to a temperature

Card 1/5

Preparation and investigation of ...

S/576/617000/000/013/020
E036/E162

4

somewhat above the melting point of the refractory component in an evacuated (10^{-4} mm Hg) quartz ampoule. This temperature is maintained for about two hours and then further slow heating up to the melting point of the compound takes place. This final temperature is maintained for eight hours. Homogenisation is achieved by maintaining a temperature about 200° above this point for two hours. After this the material is annealed at $700-800^{\circ}\text{C}$ for several hours and slowly cooled to room temperature. The material was uniform, Ag_2Te and Ag_2Se being n-type whilst SnTe and CdTe were p-type. X-ray and electron diffraction gives the following results: 1) Ag_2Te has a hessite structure containing excess Ag. 2) Ag_2Se has the naumannite structure (β -phase), and appears from electron diffraction evidence to maintain this during vaporisation. 3) SnTe has a cubic lattice ($a = 6.285 \text{ \AA}$), and does not dissociate during evaporation. 4) CdTe has a sphalerite structure with $a = 6.41 \text{ \AA}$ and does not dissociate during evaporation. Electron diffraction shows the condensed material to be a mixture of polycrystals and orientated single crystals. Thin layers ($\sim 0.5 \mu$) are obtained by depositing on glass

Card 2/5

Preparation and investigation of ...

³⁰⁹⁵⁶
S/576/61/000/000/013/020
E036/E162

substrates in a vacuum of 10^{-4} mm Hg. The densities were 8.08, 7.50, 6.02 and 5.57 g/cm³ for Ag₂Te, Ag₂Se, SnTe and CdTe respectively. Gold bands are deposited on the thin layers to facilitate conductivity measurements. The room temperature conductivities of 38 and 257 Ω^{-1} cm⁻¹ of Ag₂Te and Ag₂Se were an order less than the bulk values. This is explained by the enhanced importance of the high resistance grain boundaries in the thin layers. The temperature dependence of the conductivity of Ag₂Te (curve 1) and Ag₂Se (curve 2) is shown in Fig.1, where the conductivity in Ω^{-1} cm⁻¹ is plotted against $10^3/T$, where T is the temperature in °K. Similar curves are obtained for large samples. The sharp change in conductivity is due to a polymorphic transformation. The results show that the β modifications of Ag₂Te below 150° and Ag₂Se below 140° are semiconducting with activation energies of 0.13 and 0.09 eV. Above the polymorphic transformation temperature the conduction is metallic. This change corresponds to a change in the bonding from covalent to polar. The thermal conductivities have not been reported in the literature and are given in Fig.2, as a function of temperature.

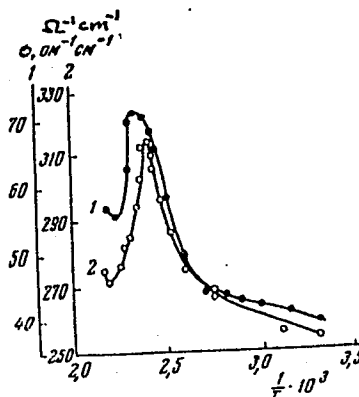
Card 3/5

Preparation and investigation of ...

30956
S/576/61/000/000/013/020
E036/E162

Ag₂Te and Ag₂Se have minima at 140 and 150°, corresponding to the polymorphic transformation.
There are 2 figures and 2 non-Soviet-bloc references.

Fig.1



Card 4/5

33112

S/638/61/001/000/039/056
B108/B138

9.2150 (1020, 1159, 1331)

AUTHORS:

Abdullayev, G. B., Akhundov, G. A.

TITLE:

Investigation of diffusion processes in selenium rectifiers
by means of radioactive isotopes

SOURCE:

Tashkentskaya konferentsiya po mirnomy ispol'zovaniyu
atomnoy energii. Tashkent, 1959. Trudy. v. 1. Tashkent,
1961, 252-256

TEXT: The authors studied the diffusion of thallium, tin, and indium in
polycrystalline selenium; cadmium, tin, and thallium in a cadmium-tin alloy,
and of thallium and selenium in Tl_2Se . The radioactive isotopes
 Tl^{204} , $Sn^{113-123}$, In^{114} , and Se^{75} were used, successive thin layers were
removed from the initially 99.994% pure selenium. The diffusion coefficient
in selenium between 50 and 200°C are

$$D_{Tl \rightarrow Se} = 1.38 \cdot 10^{-6} \exp(-0.35/kT) \text{ cm}^2/\text{sec}$$

$$D_{Sn \rightarrow Se} = 4.78 \cdot 10^{-8} \exp(-0.39/kT) \text{ cm}^2/\text{sec}$$

Investigation of diffusion ...

33112
S/638/61/001/000/039/056
B108/B138

$$D_{\text{In} \rightarrow \text{Se}} = 5.15 \cdot 10^{-6} \exp(-0.39/kT) \text{ cm}^2/\text{sec.}$$

The low activation energies indicate that the atoms or ions of Tl, Sn, and In are located in the hexagonal Se lattice and diffuse through the interstitial sites. The temperature dependence of the diffusion coefficients of Cd, Sn, and Tl in a Cd-Sn alloy between 50 and 170°C are

$$\begin{aligned} D_{\text{Cd} \rightarrow \text{Cd-Sn}} &= 4.43 \cdot 10^{-8} \exp(-0.20/kT) \text{ cm}^2/\text{sec} \\ D_{\text{Sn} \rightarrow \text{Cd-Sn}} &= 5.92 \cdot 10^{-7} \exp(-0.29/kT) \text{ cm}^2/\text{sec} \\ D_{\text{Tl} \rightarrow \text{Cd-Sn}} &= 6.30 \cdot 10^{-4} \exp(-0.60/kT) \text{ cm}^2/\text{sec.} \end{aligned}$$

Activation energy increases with rising melting point, and also with atomic radius (linearly). It is suggested that a thin Tl_2Se layer forms on the upper electrode of selenium rectifiers with Tl impurities, and that it acts as a p-n junction in contact with the selenium. From a special investigation of rectifiers with a Tl_2Se layer on various upper-electrode backings, the temperature dependences of the diffusion coefficients were found to be

Card 2/3

BAKHYSHOV, A.E.; AKHUNDOV, G.A.

Photoelectric properties of indium selenide , and InSe - Se
barrier-layer photocells. Izv. AN Azerb.SSR.Ser.fiz.-mat.
i tekhn. nauk no.4:45-50 '61. (MIRA 14:12)
(Photoelectricity)
(Indium selenide)

S/233/62/000/006/004/008
E010/E420

AUTHORS: Iskender-Zade, Z.A., Akhundov, G.A.

TITLE: An investigation of lifetime and current-voltage characteristics of silicon diodes

PERIODICAL: Akademiya nauk Azerbaydzhanskoy SSR. Seriya fiziko-matematicheskikh i tekhnicheskikh nauk, no.6, 1962, 49-62.

TEXT: Silicon p-n junctions have deviations from the theory of ideal p-n junctions due to recombination processes of charge carriers. The present investigation studied recombination of carriers in plane silicon diodes manufactured by the known technique, as well as the effect of the latter on diode characteristics. The method employed for the measurements of lifetime of unbalanced carriers was that of transition characteristics of a p-n junction. The method is based on measuring time t for which the reverse current obtained by switching over a diode remains constant and by using the following formula

$$\operatorname{erf} \sqrt{\frac{t}{\tau}} = \frac{1}{1 + I_{dir}/I_{rev}}$$

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(1)

An investigation of lifetime ...

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where I_{dir} and I_{rev} are values of direct and reverse currents respectively. The measurements were conducted at the ratio $I_{rev}/I_{dir} = 0.5$; then $\tau = t/0.47$. Another method used for measuring τ was by determining the decrease of post-injection emf at the p-n junction. The dependence of τ , measured by both these methods, on duration of injection pulse was checked and represented by 6 curves (different measurements) in Fig.4. The temperature dependence of τ was determined from

$$\tau = \frac{\tau_{po}}{n_0} \frac{2}{\sqrt{3}} (2\pi m_0 k)^{3/2} T^{3/2} e^{-\frac{\Delta E_t}{kT}}, \quad (4)$$

where τ_{po} is lifetime of holes injected into specimens of n-type, v is thermal velocity of holes, σ_p the trapping cross section for holes by recombination centers and n_0 is equilibrium concentration of majority carriers. This formula leads to the value of activation energy $\Delta E_t = 0.24$ eV. The dependence of τ on the value of injection level was found to obey the Shockley theory which predicts a linear relationship, from the slope of which can be obtained the value of τ_{po} and by extrapolation to Card 2/4

An investigation of lifetime ...

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E010/E420

zero-level τ_0 . It was found that τ_{∞} is independent of temperature for all diodes investigated. The current-voltage characteristic of the p-n junction, with allowance for recombination in a space-charge layer, is expressed by

$$I = I_0^* \left(e^{\frac{q\phi}{\beta kT}} - 1 \right) \quad (17)$$

It was found that the value of the exponent factor β was confined in the limits $1 \leq \beta \leq 2$ for all diodes investigated in the temperature range 75 to 140°C. The current-voltage characteristic yields the value of activation energy $\Delta E = 0.57 \pm 0.04$ eV which coincides with the half-width of the silicon forbidden band. Capacitance measurements, carried out by the bridge method at audio frequencies and different temperatures, yielded the values of concentration of recombination centers $N_t \approx 4.7 \times 10^{12} \text{cm}^{-3}$ and that of ionized impurities $\approx 4 \times 10^{13} \text{cm}^{-3}$. Then the effective cross section of center trapping σ can be determined by

(11)

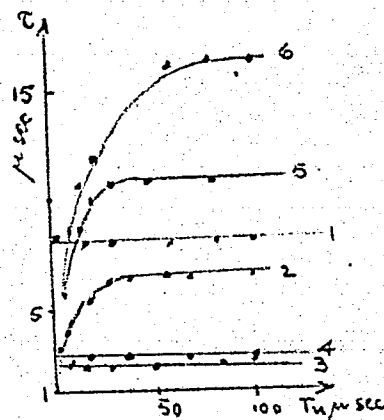
Card 3/4

An investigation of lifetime ...

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E010/E420

which leads to the value $\sigma \sim 10^{-16} \text{ cm}^2$, which agrees with literature data. There are 12 figures and 6 tables.

Fig.4. Dependence of measured time τ on the time of injection pulse.



Card 4/4

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24,7700

37930

S/181/62/004/005/019/055
B125/B104

AUTHORS: Guseynov, G. D., Akhundov, G. A., and Abdullayev, G. B.

TITLE: Electrical and thermoelectrical properties of TlSe single crystals

PERIODICAL: Fizika tverdogo tela, v. 4, no. 5, 1962, 1206-1212

TEXT: Electrical conductivity, Hall effect, and thermo-emf of TlSe single crystals in the range 80-570°K were measured by a d-c compensation method. Electrical conductivity and Hall effect were measured with molybdenum probes, and the thermo-emf with the copper branches of thermocouples. The probes and thermocouples were contained in an externally cooled, evacuated glass tube (10^{-3} mm Hg) with inserted quartz tube. The Hall emf measured in fields of 1,800-10,000 oe varied from 0.02 to 13 mv. Figs. 4a and 4b show the measured temperature dependence of electrical conductivity and Hall effect in the range 80-570°K for specimens of 1,4,28,130, and 1700 ohm-cm at 20°C (curves 1-5). In these specimens, intrinsic conductance arises at 240, 180, 60, -35, and -65°C. Below these temperatures, specimens 1-3 behave like metals, whereas 4 and 5 behave like

Card (1/4) 3

Electrical and thermoelectrical ...

S/181/62/004/005/019/055
B125/B104

semiconductors over the entire temperature range. The temperature dependence of electrical conductivity is chiefly determined by the carrier concentration. With rising temperature the Hall constant R decreases sharply in the range of intrinsic conductance without losing its positive sign. The forbidden-band widths determined from the temperature dependence of conductivity and Hall constant are similar for the specimen with the highest resistivity. The Hall mobility μ of specimens 1-4, determined by simultaneous measurement of σ and R , reaches a maximum at $\sim 100^\circ\text{K}$ and decreases as $\mu \propto T^{-3/2}$ with rising temperature. The Hall mobility of specimen 5 decreases monotonely as the temperature rises from 100 to 570°K . The absolute value of the emf α decreases in the range of intrinsic conductance with rising temperature. From 170°K downward α rapidly increases with decreasing temperature. This abnormal increase in the specimens with the highest resistivities indicates the entrainment of carriers by phonons. The effective carrier masses were calculated from α and R and found to be $m_n^* = 0.3 m_0$ and $m_p^* = 0.6 m_0$. The temperature dependence of the forbidden-band width (in eV) is given by $\Delta E = 0.57 - 3.9 \cdot 10^{-4} T$. There are 6 figures. The most important English-language reference is: P. Fielding, G. Fisher and E. Mooser. J. Phys. Chem. Card 2/4 3

110546

S/249/62/018/001/001/003

1017/1217

26.2420

AUTHORS: Mekhtiyev, R. F., Abdullayev, G. B. and Akhundov, G. A.

TITLE: The technique of growing single crystals of GaSe and the investigation of some of their properties

PERIODICAL: Akademiya nauk Azerbaydzhanskoy SSR. Doklady, v. 18, no. 1, 1962, 11-15

TEXT: A review is given of ten papers on the influence of Ga and Tl on the electrical conductivity of Se, on the photoelectric properties of Ga and other selenides, and on the preparation of GaSe single crystals. A new method is proposed for the preparation of GaSe single crystals. The molten components in stoichiometric proportions are heated in a quartz ampule at 600° for 20 hours. The mixture is heated to 1060°C (GaSe melts at 960°) for ten hours, then cooled slowly to room temperature. The X-ray patterns of the synthesized GaSe are identical with those described in the literature. A special apparatus for gradual cooling is described. The temperature is lowered first at the rate of 2°C per hour until complete solidification, then at 6°C per hour down to 900°C, and finally 25°C per hour down to 500°C. At all stages a constant temperature gradient is maintained. Heating can be regulated without disturbing the furnace or the sample. The crystals obtained are 10 mm in diameter and 10 cm long. For both vertical and horizontal positions of the ampule, the plane of growth was (001). At room temperature, the specific resistance and the concentration of holes and

Card 1/2

S/249/62/018/004/001/003
1040/1240

AUTHORS: Akhundov, G. A. and Abdullayev, G. B.

TITLE: TlSe point diodes

PERIODICAL: Akademiya nauk Azerbaydzhanskoy SSR Doklady, v 18, no. 4, 1962, 11-13

TEXT: This communication gives the results of experiments on the synthesis and rectifying characteristics of TlSe with *n*-type conductivity. Four previous papers have dealt with the physical properties of TlSe crystals with *p*-type conductivity. Single crystals of *n*-type TlSe were obtained from *p*-type TlSe by addition of 0.1 wt % Ge and Sn to the melt. They were grown by vertical and horizontal zone melting. Rectification at a point was studied by means of electrolytically sharpened probes made of 0.15 mm tungsten wire. The probe was attached to the polished crystal face, at 90° to the C plane, opposite the Au or Sn base electrode. The voltage and current were observed on the oscillograph screen at 50 cps and photographed under direct current. The samples were 1 × 2 × 2 mm parallelepipeds. It was found that the supply of voltage at the point contact is associated with shape effects. The passage of a larger direct current improves the direct characteristic without impairing the inverse. These diodes are rather stable but not very good. There are 4 figures and 1 table.

ASSOCIATION: Institut fiziki (Institute of Physics)

SUBMITTED: February 10, 1962

Card 1/1

Study of monocrystalline n-TlSe and its rectifying properties.
G. A. Akhundov, G. B. Abdulayev, I. G. Aksianov.

(Not presented).]

Electro-physical properties of monocrystalline TlSe. G. A. Akhundov,
G. B. Abdulayev, G. D. Guseynov, N. Kh. Aliyeva.

[Investigation of the electrical properties of germanium telluride.
G. B. Abdulayev, V. B. Antonov, Ya. N. Nasirov.

On studies of and some properties of monocrystalline GaTe and GaS.
G. A. Akhundov, G. B. Abdulayev, N. A. Gasanova, F. I. Ismailov.

[Investigation of some physical properties of the monocrystalline
compounds CuSbS_2 and CuSbSe_2 . G. B. Abdulayev, R. Kh. Kani, Ya. N.
Nasirov, T. G. Osmanov.

Report presented at the 3rd National Conference on Semiconductor Compounds,
Kishinev, 16-21 Sept 1963

ISKENDERZADE, Z.A.; ABDULLAYEV, G.B.; AKHUNDOV, G.A.

Some results of electrolytic cadmium deposition on a selenium plate.
Trudy Inst. fiz. AN Azerb. SSR 11:11-18 '63. (MIRA 16:4)
(Cadmium planting)

L 19011-63 BDS/EWT(1)/EWP(q)/EWT(m) AFFTC/ASD/ESD-3/IJP(C)
 RDW/JD/JG.
 ACCESSION NR: AP3005313 S/0181/63/005/008/2087/2089
 AUTHORS: Aliyeva, M. Kh.; Akhundov, G. A. 72
 TITLE: Kinetics of photoconductivity in single crystals¹⁸ of p-TlSe 65
 SOURCE: Fizika tverdogo tela, v. 5, no. 8, 1963, 2087-2089
 TOPIC TAGS: kinetics, photoconductivity, p-TlSe, Tl, Se, Sn, Ge, Si, conduction band, hole, thermal ejection, relaxation, trapping level, recombination, valence band, ionization, acceptor level
 ABSTRACT: Photoconductivity was studied in single crystals of P-TlSe¹⁸ having a specific resistance of 40 ohm/cm. The ohmic contacts were of gold, deposited from vapor in an evacuated atmosphere. Oscillograms of relaxations curves were obtained, and these show two components (one rapid, one slow) in the decline of photoconductivity. With increase in light intensity the amplitudes of both components increase at first, then the slow one becomes constant. With continued increase in intensity the slow component decreases and, finally, disappears. At low temperatures (below -50C) the probability of thermal ejection of electrons to the conduction band is less than the probability of direct recombination with holes of the valence band. In p-TlSe the acceptor levels are near the conduction band and, apparently, are
 Card 1/2

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ACCESSION NR: AP3005313

completely ionized at room temperature. The introduction of ²¹Sn, ⁷¹Ge, and ²¹Si impuri-
ties into single crystals of n-TlSe has supplied material for further investigation
in this field. "The authors thank G. B. Abdullaev and S. M. Ry*vkln for their
interest in the work and for useful advice." Orig. art. has: 3 figures and 2
formulas.

ASSOCIATION: Institut fiziki AN Azerb. SSR Baku (Institute of Physics, Academy of
Sciences, Azerbaijan, SSR)

SUBMITTED: 18Feb63

DATE ACC: 06Sep63

ENCL: 00

SUB CODE: PH

NO REF SOV: 006

OTHER: 003

Card 2/2

ACCESSION NR: AP4004877

S/0181/63/005/012/3620/3621

AUTHOR: Ismaylov, F. I.; Guseynova, E. S.; Akhundov, G. A.

TITLE: Optical absorption edge of GaS and GaSe single crystals

SOURCE: Fizika tverdogo tela, v. 5, no. 12, 1963, 3620-3621

TOPIC TAGS: gallium sulfide, gallium selenide, optical absorption, optical absorption edge

ABSTRACT: The optical density of GaS and GaSe monocrystals was measured as a function of wavelength in the interval $\lambda = 400-750$ m μ at temperatures between 280 and 580K. The resistivity of p-type GaS and p-type GaSe samples, obtained by a method of slow cooling at a constant temperature gradient, was 10^{10} and 20 ohm \cdot cm, respectively. The width of the forbidden band determined from the absorption edge at room temperature was found to be 2.53 eV for GaS and 1.97 eV for GaSe. The temperature coefficients of the forbidden band width for GaS and GaSe were -7.2×10^{-4} and -8×10^{-4} eV/deg, respectively. Orig. art. has: 2 figures.

Card ~~172~~

Instit. Physics AN AZSSR, Baku

AKHUNDOV, G. A.; ABDULLAYEV, G. B.; GUSEYNOV, G. D.; MEKHTIYEV, R. F.; ALIYEVA, M. KH.

"Preparation and investigation of A III B VI single crystals."

paper submitted for Intl Conf on Physics of Semiconductors, Paris, 19-24 Jul 64.

ACCESSION NR: AP4012601

S/0233/63/000/005/0095/0100

AUTHORS: Akhundov, G.A.; Dzhafarova, E.A.; Iskender-Zade, Z.A.

TITLE: Analysis of the capacitance of silicon diodes

SOURCE: AN AzerbSSR. Izv. Ser. fiz.-matem. 1 tekhn. nauk, no. 5, 1963, 95-100

TOPIC TAGS: p-n transitions, volume charge, diffusion capacity, frequency dependence of capacitance, silicon, silicon diode, diode, silicon diode capacitance

ABSTRACT: The authors have investigated the dependence of the capacitance of the p-n transitions on the constant reversed bias, on temperature, and on the frequency of the ac-signal. Specimens were prepared from n-type silicon into which aluminum was introduced by thermal diffusion. The measurement of the capacitance was made with the MLE-1 bridge which was fed by the sound generator SG-10. The electron-beam equilibrium indicator EBEL-3 was used. Measurements

Card 1/2

ACCESSION NR: AP4012601

were made at temperatures of melting ice, dry ice, freezing point of ethyl alcohol, and liquid nitrogen. The results of measurements are discussed in terms of changes of the volume charge and concentration of charge carriers (diffusion capacitance). The latter is temperature dependent. The author is grateful to Prof. G.B. Abdullayev for interest in the work. Orig. art. has: 8 figures and 2 tables.

ASSOCIATION: None

SUBMITTED: 00

DATE ACQ: 26Feb64

ENCL: 00

SUB CODE: PH, GE

NO REF SOV: 001

OTHER: 002

Card 2/2

GUSEYNOV, G.D.; AKHUNDOV, G.A.

Anisotropy of the electroconductivity and Hall constant of p-TlSe.
Fiz. tver. tela 6 no.2:634-636 F '64. (MIRA 17:2)

1. Institut fiziki AN AzSSR, Baku.

ACCESSION NR: AP4013534

S/0181/64/006/002/0634/0636

AUTHORS: Guseynov, G. D.; Akhundov, G. A.

TITLE: Anisotropy of the electrical conductivity and the Hall Constant in p type TlSe

SOURCE: Fizika tverdogo tela, v. 6, no. 2. 1964, 634-636

TOPIC TAGS: electric conductivity, Hall constant, semiconductor, single crystal

ABSTRACT: These properties for a single direction have been discussed by several investigators, but the authors have examined the properties in single crystals of p-type TlSe for different directions. The temperature range investigated was from 80 to 573K. The authors have found that conductivity varies according to the crystallographic direction. The relations are shown graphically in Fig. 1. on the Enclosures. They found also that the Hall component is constant but differs for various crystallographic directions. This is shown graphically in Fig. 2. on the Enclosures. "The authors thank Professor G. B. Abdullayev for his constant interest in the work." Orig. art. has: 2 figures.

ASSOCIATION: Institut fiziki AN Az. SSR, Baku (Institute of Physics AN Az. SSR)

Card 1/4

ACCESSION NR: AP4013534

SUBMITTED: 05Aug63

DATE ACQ: 03Mar64

ENCL: 02

SUB CODE: EC,SS

NO REF SOV: 006

OTHER: 000

Card 2/4

AGCESSION NR: AP4013534

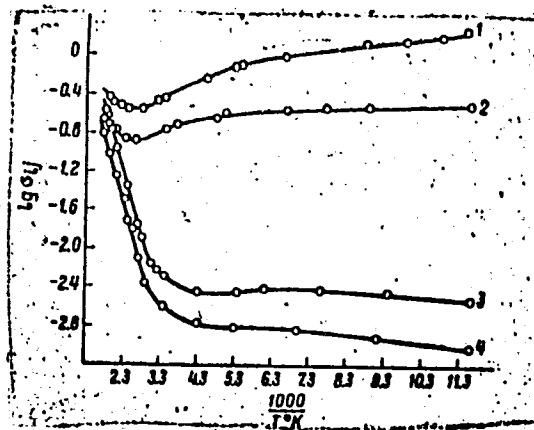
ENCLOSURE: 01

Fig. 1. Dependence of conductivity components in TlSe crystals on reciprocal temperature.

Curves 1 and 2 are for sample A, with $\sigma_{11} = \sigma_{22} = 0.42 \text{ ohm}^{-1} \text{ cm}^{-1}$ and $\sigma_{33} = 0.17 \text{ ohm}^{-1} \text{ cm}^{-1}$ at room temperature; curves

3 and 4 for sample B, with $\sigma_{11} = \sigma_{22} = 4.8 \cdot 10^{-3} \text{ ohm}^{-1} \text{ cm}^{-1}$ and $\sigma_{33} = 2.5 \cdot 10^{-3} \text{ ohm}^{-1} \text{ cm}^{-1}$; curves 1 and 3 are for

current density along $[110]$, σ_{11} ; 2 and 4 for current density along $[001]$, σ_{33} .



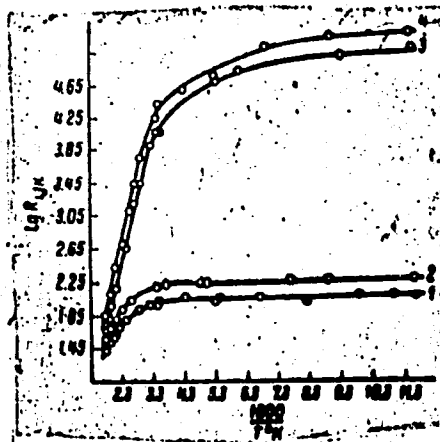
Card 3/4

ACCESSION NR: AP4013534

ENCLOSURE: 02

Fig. 2. Temperature dependence of components of the Hall constant in crystals of TlSe. 1 and 2 are for sample A; 3 and 4 for B; 1 and 3 have the electrical field directed along $[110]$, the magnetic field along $[001]$; 2 and 4 are for the opposite orientation;

hence, 1 and 3 give R_{110}^{001} and 2 and 4 give R_{001}^{110} , where the lower indices indicate current direction, the upper indicate magnetic direction.



Card 4/4

ACCESSION NR: AP4042524

S/0109/64/009/007/1281/1286

AUTHOR: Abdullayev, G. B.; Iskender-Zade, Z. A.; Dzhafarova, E. A.;
Akhundov, G. A.

TITLE: Effect of electrothermal treatment on the properties of silicon diodes

SOURCE: Radiotekhnika i elektronika, v. 9, no. 7, 1964, 1281-1286

TOPIC TAGS: semiconductor, silicon diode, semiconductor diode, silicon diode
electrothermal treatment

ABSTRACT: The variation of a reverse current in Si diodes as a result of the prolonged application of a d-c reverse voltage at an elevated temperature was experimentally studied. An Si diode was held for 6 hrs at a reverse voltage of 150 v and a temperature of 448K; its initial reverse current of 2.8 ma dropped to a stable value of 0.9 ma with no variation in the forward current. The effect of temperature on the reverse current was also studied. It was found that the

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ACCESSION NR: AP4042524

activation energies of minority-carrier formation were 0.21 and 0.08 ev; after a treatment at 290-375K, recombination centers lying 0.56 ev deep became predominant. "The authors wish to thank B. M. Vul for discussing the work and for valuable comments." Orig. art. has: 7 figures and 1 table.

ASSOCIATION: Institut fiziki AN AzerbSSR (Institute of Physics, AN AzerbSSR)

SUBMITTED: 11May63

ATD. PRESS: 3081

ENCL: 00

SUB CODE: EC

NO REF SOV: 004

OTHER: 005

Card

2/2

ACCESSION NR: AP4044647

S/004R/64/028/008/1323/1327

AUTHOR: Guseynov, G. D.; Akhundov, G. A.; Aliyeva, M. Kh.;
Abdullayev, G. B.

TITLE: Electrophysical properties of thallium selenide single
crystals

SOURCE: AN SSSR. Izv. Seriya fizicheskaya, v. 28, no. 8, 1964,
1323-1327

TOPIC TAGS: thallium selenide, single crystal, semiconductor single
crystal, electrical property, photoelectric property, thermo-
electric property, crystal heat treatment

ABSTRACT: The purpose of the study was to prepare more perfect
thallium selenide (TlSe) single crystals and to establish the tem-
perature and carrier concentration dependence of their electrical
and photo- and thermoelectric properties. Indications are that
TlSe might find a use in selenium rectifiers, infrared sensors, x-
ray detectors, and vitreous semiconductor devices. Also TlSe single crys-

L 8656-65

ACCESSION NR: AP4044647

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tals with an impurity concentration as low as $6 \times 10^{13} \text{ cm}^{-3}$ were grown by multiple-pass zone crystallization. Electrical measurements show that the temperature dependence of the electric conductivity and Hall constant acquired a typically semiconductor, stable character only after prolonged heat treatment of the samples. Thus, the spectral distribution of the conductivity was greatly affected by the heat treatment, resulting in a decrease in hole concentration in the 10^{14} – 10^{17} cm^{-3} range, which corresponds to a change in the width of the band gap from 0.33 to 0.45 eV. The sharp change in electrical and optical properties of certain TlSe crystals caused by heat treatment is explained by creation of unstable acceptor centers (thermoacceptors) in the crystal growth process and their disappearance after heat treatment. Thermoacceptors are believed to result from thermal stress. This belief is confirmed by x-ray diffraction patterns. The thermal emf was measured in the 80–570K range in p- and n-type TlSe single crystals over a wide impurity concentration range. Thermal emf values considerably higher than theoretical values were obtained below 180K in the high-resistance p- and n-type samples and were taken as an indication of

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ACCESSION NR: AP4044647

the phonon drag effect. The latter effect was detected in both crystallographic directions of the tetragonal crystal, and was further substantiated by graphic comparison of the temperature dependent electronic and phonon components of the thermal

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ENCL: 00

SUB CODE: IC,SS

NO REF 3071 110

OTHER: 001

AKHUNDOV, G.A.; AKSYANOV, I.G.

Rectifying properties of TlSe single crystals. Izv. AN Azerb.
SSR. Ser. fiz.-tekh. i mat. nauk no.1:75-77 '64. (MIRA 17:9)

GUSEYNOV, G.D.; AKHUNDOV, G.A.

Anisotropy of the electric properties of p-TlSe single crystals.
Dokl. AN Azerb. SSR 21 no.1:8-13 '65.

(MIRA 18:5)

1. Institut fiziki AN AzerSSR.

AKHUNDOV, G.A.; ABDULLAYEV, G.F.; GUSEYNOV, G.D.; MEKHTIYEV, R.F.; ALIYEVA,
M.Kh.; CHSEYNOVA, E.S.; GASANOVA, I.A.

AIIBV. semiconductors. Izv. AN Azerb.SSR.Ser.fiz.-tekhn. i mat. nauk
no.3:107-114 '64. (MIRA 17:12)

ACCESSION NR: A2504138

AUTHORS: Gasanov, N. A. Akhundov, G. A. 2/6

Optical absorption of GaAs single crystals

SOURCE: *Opelka* 1 Sp. v. Dekoplya, V. 18, no. 4, 1965, 751-753

TOPIC TAGS: gallium telluride, single crystal, optical absorption, fine structure, polarization

ABSTRACT: The gallium telluride was synthesized by melting the

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which shifted towards 7000 Å at higher temperatures. A weaker band with maximum at 6000 Å appeared; the structure was observed at helium temperature. Some differences between the structures produced in different environments were observed. Attempts to identify the structures were made.

L 6144 65

ACCESSION NR:

AF5011138

AUTHOR: Akhundov, G. A.

TITLE: Electroluminescence

SUBJECT: gallium selenide

TOPIC TAGS: gallium selenide, electroluminescence, luminescence
brightness, single crystal, current dependence

ABSTRACT: Following up the possibility of investigating the
electroluminescence of single crystals of gallium selenide

Cere

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posite surfaces of the crystal were used in the measurements.
The samples were placed in liquid nitrogen. The excitation

END 2/1

ACCOUNT: 1111 1111

ASSOCIATION: None

EXPIRATION: 1111

NUMBER: 000

Card 1/3

L 63377-65 EWT(1)/EWT(m)/T/EWP(t)/EWP(b)/EWA(c) IJP(c) JD/JG

ACCESSION NO: APS 1977C

DECLASS BY: 001340 1303

AUTHOR: Akhundov, G. A.; Aksyanov, I. G.

TITLE: Investigation of the electroluminescence of single-crystal GaSe

REPORT: Zhurnal tekhnicheskoy fiziki, v. 43, no. 1, 1977, p. 1-4

1. The electroluminescence of single-crystal GaSe is investigated. It is shown that the electroluminescence of GaSe is characterized by a high quantum yield and a high efficiency.

ABSTRACT: This is a sequel of earlier work on the electroluminescence of GaSe. The results of the investigation of the electroluminescence of single-crystal GaSe are presented. It is shown that the electroluminescence of GaSe is characterized by a high quantum yield and a high efficiency.

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L 63377-65

ACCESSION NR: AP5019770

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of GaSe. It is assumed that radiative recombination between the conduction band and the levels near the valence band take place. "The authors thank G. F. Abdul-
lajee for his continuing interest and valuable advice in the preparation of this paper.

ASSOCIATION: none

SUBMITTED: 08Feb65

ENCL: 01

SUB CODE: SS, OF

NO REF SOV: 001

OTHER: 002

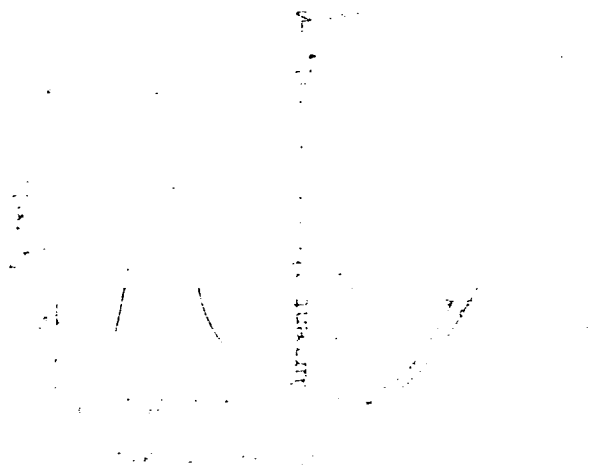
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Card 2/3

L 63377-65

ACCESSION NR: APS012770

ENCLOSURE: 01



Left - Electroluminescence in GaAs_{0.5}P_{0.5} crystal irradiated
by a constant field at 77°K. Right - Voltage-current charac-
teristic (1) and dependence of light on voltage (2) at 77°K.

Card 3/3

11-11-11 EWT(1)/EWT(2)/EWT(3)/EWT(4)/EWT(5)/EWT(6)/EWT(7)/EWT(8)/EWT(9)/EWT(10) IJP(c) RIM/JD

AUTHOR: Juseynov, S. D.; Arkundov, A. I.

TITLE: Anisotropy of the electrical properties of single-crystal p-TiSe

SOURCE: AN AzerbSSR. Doklady, v. 21, no. 1, 1965, 8-13

TOPIC TAGS: anisotropy, resistivity, Hall constant, Brillouin zone, galvanomagnetic properties, thallium selenide

ABSTRACT: The authors have measured the electric resistivity and the Hall effect of p-TiSe in different directions of two typical crystals having different properties. It was found that the resistivity and the Hall effect are anisotropic. It was also found that the Hall effect is anisotropic in different directions. The authors also measured the Hall effect in different directions of the same crystal. It was found that the Hall effect is anisotropic in different directions. The authors also measured the Hall effect in different directions of the same crystal. It was found that the Hall effect is anisotropic in different directions.

Card 1/2

L 59486-65

ACCESSION NR: AP5011792

2

ing with a lower value (220K). The conductivities are different in different crystallographic directions and with temperature variations remain the same as functions of the direction. The results are interpreted from the point of view of the possible structure of the polymer.

[illegible]

AGENTS

SUBMITTED: 15 Oct 63

ENC: 00

SUB CODE: SS, EM

NR REF SOV: 005

OTHER: 000

Cord $2\frac{1}{2}$

1. 2000-04 EEC(r)-2/EWG(r)/EEC(k)-2/EWA(h)/EWA(k)/EWP(k)/EWT(l)/EWT(m)/EEC(t)/FBD/

TOPIC TAGS: laser, electron beam laser, coherent light

ABSTRACT: Achievement of laser action in a III-VI semiconductor (GaSe) pumped by an electron beam. Samples of GaSe with a carrier concentration of $5 \times 10^{15} \text{ cm}^{-3}$ and resistivity of 2000 ohm-cm were prepared by liquid plane-parallel faces. Monocrystalline samples 1 mm thick or less, cooled by liquid nitrogen, were irradiated with a 2- μsec 200-keV electron beam directed to the cleaved surface at an angle of 7° degrees. The emission spectrum was observed at an angle of 7° degrees. The emission spectrum was observed at

forbidden gap of GaSe at 1.28 eV

Card 1/8

L 22776-06 EWT(m)/T/EWP(t) IJP(c) JD/JG/JXT(HS)
ACC NR: AP6009323 SOURCE CODE: UR/0249/65/021/011/0009/0011

AUTHOR: Akhundov, G. A.; Ismaylov, F. I.; Kaziyeu, F. N.

ORG: Institute of Physics, Academy of Sciences Azerbaydzhan SSR (Institut fiziki
Akademii nauk Azerbaydzhanskoy SSR)

TITLE: Photoconductivity of GaS single crystals

SOURCE: AN AzerbSSR. Doklady, v. 21, no. 11, 1965, 9-11

TOPIC TAGS: gallium compound, single crystal, photoconductivity, spectral distribution, forbidden band, carrier lifetime

ABSTRACT: In view of the fact that the GaS compound has been little studied in the past, and can be produced in the form of thin single crystals with natural specularly-reflecting faces, the authors have produced such single crystals and investigated their physical properties. The GaS compound was synthesized in an evacuated quartz ampoule by a procedure devised by the authors, which is briefly described, and the single crystals were grown with apparatus described by the authors earlier (DAN AzerbSSR, 1962, 18, 11). The spectral distribution of the photoconductivity was measured with a spectrophotometer (SF-4) in the 245-415K interval. The spectrum consisted of a single line with a maximum near 0.50 μ .

Card 1/2

L 22776-66

ACC NR: AP6009323

The width of the forbidden band decreased linearly with increasing temperature (~ 2.45 ev at 300K), with a temperature coefficient -6.9×10^{-4} ev/deg. This agrees with data obtained by the authors from the temperature shift of the intrinsic-absorption edge (FTT v. 5, 3620, 1963). The photocurrent increases with illumination as ϕ^n (ϕ — illumination, $n = 0.5$). The photocurrent increases more slowly with the temperature up to 380K, and then more rapidly. Since the samples were of the p-type, the chemical potential increased upon heating, and the lifetime of the nonequilibrium carriers increased. It is therefore concluded that the temperature dependence of the photocurrent is due to changes in the lifetime of the nonequilibrium carriers. The carrier activation energy calculated on the basis of this conclusion is 0.8—0.9 ev. Different excitations caused the GaS crystals to glow, and this will be the subject of a separate paper. The authors thank Professor G. B. Abdullayev for continuous interest in the work and for valuable advice. This report was presented by Academician Z. I. Khalilov of the Academy of Sciences of the Azerbaydzhan SSR. Orig. art. has: 2 figures. [02]

SUB CODE: 20/
ATD PRESS: 4 229

SUBM DATE: 06Apr65/

ORIG REF: 002/

OTH REF: 002

L 00869-67 T/EWP(t)/ETI IJP(c) JD/JO

ACC NR: AP6024353

SOURCE CODE: GE/0030/66/016/001/K015/K016

AUTHOR: Akhundov, G. A.; Kerimova, T. G.

ORG: Institute of Physics, Academy of Sciences of the Azerbaydzhan SSR, Baku

TITLE: Infrared absorption of $A^{III}B^{VI}$ single crystals

SOURCE: Physica status solidi, v. 16, no. 1, 1966, K15-K16

TOPIC TAGS: gallium compound, sulfide, selenide, indium compound, thallium compound, semiconductor single crystal

ABSTRACT: Transmission spectra of GaS, GaSe, InSe, and TlSe single crystals in the 0.75-25 μ range were recorded at 300°K with an infrared spectrometer (see Fig. 1 and 2). It is apparent that GaS and GaSe have wide transmission ranges, 0.75-14 μ and 0.75-17 μ respectively, and absorption bands at 14-25 μ . The intensity of these bands does not vary from sample to sample even if impurities are introduced, indicating that these bands are probably due to lattice vibrations. The spectra of InSe and TlSe also show a wide range of transparency. In contrast to GaS and GaSe, the fundamental absorption edge in the case of InSe and TlSe lies in the infrared spectral region. The forbidden gap width determined from the fundamental absorption edge is 1.2 and 0.8 eV for InSe and TlSe respectively. Authors thank Dr. G. B. Abdullayev for many helpful discussions. Orig. art. has: 2 figures.